

Higher order energy functionals

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The study of higher order energy functionals was first proposed by Eells and Sampson in 1965 and, later, by Eells and Lemaire in 1983. These functionals provide a natural generalization of the classical energy functional. More precisely, Eells and Sampson suggested the investigation of the so-called $ES - r$ -energy functionals

$$E_r^{ES}(\varphi) = (1/2) \int_M |(d^* + d)^r(\varphi)|^2 dV,$$

where $\varphi : M \rightarrow N$ is a map between two Riemannian manifolds.

After giving a short overview on similar higher order variational problems we clarify some relevant issues about the definition of an $ES - r$ -harmonic map, i.e, a critical point of $E_r^{ES}(\varphi)$.

Then, we will present several examples of proper critical points of $E_r^{ES}(\varphi)$.

Finally, we shall also show that the functionals $E_r^{ES}(\varphi)$ may not satisfy the classical Palais-Smale Condition (C).

References

- [1] V. Branding, S. Montaldo, C. Oniciuc, A. Ratto, Higher order energy functionals, *arXiv:1906.06249*.